

Notice of Allowability

Application No.

10/628,806

Examiner

Brian J. Assessor

Applicant(s)

SHIRLEY ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 2/5/07.
2. ☒ The allowed claim(s) is/are 1-23.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No./Mail Date <u>09/09/07</u> |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

DETAILED ACTION

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Colby Nuttall on 4/11/2007. The application has been amended as follows:

The following claims are to be amended as they are below:

1.

A computer-readable medium having computer executable instructions for performing steps for backing up and restoring a data set of a node in a distributed system, comprising:

initiating a back up operation of an original data set, the original data set having state data indicating that the original data set is original data rather than backup data;

before making a backup copy of the original data set, changing the state data of the original data set to indicate that the original data set is backup data

after changing the state data of the original data set, taking a snapshot of the contents of the original data set, including the state data indicating that the original data set is backup data, to generate a backup copy, the contents of the original data set

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including a plurality of changes each identified by a replication identification number of the node and a serial number; and

after taking the snapshot, resetting the state data of the original data set to again indicate that the original data set is original data rather than backup data.

2.

A computer-readable medium as in claim 1, having further computer-executable instructions for performing the steps of:

restoring the original data set using the backup copy;

detecting that the state data of the restored data set indicates that the data set backup data;

in response to the detecting, changing the replication identification number of the node from an old value used before the backup operation to a new value.

3.

A computer-readable medium as in claim 2, having further computer-executable instructions for performing the step of storing into the original data set a lowest uncommitted serial number that corresponds to a lowest one of the serial numbers of changes made to the original data set that are not yet committed prior to taking the snapshot.

5.

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A computer-readable medium as in claim 2, having further computer-executable instructions for performing the step of storing in the original data set, prior to taking the snapshot, a next serial number to be assigned to a new change to the original data set,

8.

A method for backing up and restoring contents of a data set of a node in a distributed system, comprising:

- initiating a back up operation of an original data set, original the data set having state data indicating that the original data set is original data rather than backup data;

- before making a backup copy of the original data set, changing state data of the original data set to indicate that the original data set backup data;

- after changing the state data of the original data set, taking a snapshot of the contents of the original data set, including the state data indicating that the original data set is backup data, to generate a backup copy, the contents of the data set including a plurality of changes each identified by a replication identification number of the node and a serial number; and

- after taking the snapshot, resetting the state data of the original data set to again indicate that the original data set is original data rather than backup data.

9.

A method as in claim 8, further including the steps of:

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restoring the original data set using the backup copy;
detecting that the state data of the restored data set indicates that the data set is
backup data; and

in response to the detecting, changing the replication identification number of the
node from an old value used before the backup operation to a new value.

10.

A method as in claim 9, further including the step of storing into the original data set a
lowest uncommitted serial number that corresponds to a lowest one of serial numbers of
changes made to the original data set that are not yet committed prior to taking the
snapshot.

12.

A method as in claim 9, further including the step of storing in the original data set, prior
to taking the snapshot, a next serial number to be assigned to a new change to the
original data set.

15.

A computer system for acting as a node in a distributed system, the computer system
comprising:

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a data manager for maintaining a data set containing a plurality of changes each identified by a replication identification number of the node and a serial number, the original data set having state data indicating that the original data rather than backup data;

a replication server for replicating changes made to the original data set to other nodes in the distributed system;

a backup server for generating a backup copy of the original data set, the backup server being programmed to: (i) cause the state data of the original data set to be set to indicate that the original data set is backup data before making a backup copy of the original data set, (ii) after changing the state data of the original data set, take a snapshot of the contents of the original data set, including the state data indicating that the data set is backup data, to generate the backup copy of original data set, and (iii) cause the state data of the original data set to be reset after taking the snapshot to again indicate that the original data set is original data rather than backup data.

16.

A computer system as in claim 15, wherein the replication server is programmed to detect, after the original data set is restored from the backup copy, that the state data of the restored data set indicates that the restored data set is backup data and change the replication identification number of the node from an old value used before the snapshot to a new value.

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17.

A computer system as in claim 16, wherein the replication server is further programmed to store into the original data set a lowest uncommitted serial number that corresponds to a lowest one of serial numbers of changes made to the original data set that are not yet committed prior to taking the snapshot.

19.

A computer system as in claim 16, wherein the replication server is further programmed to store in the original data set, prior to taking the snapshot, a next serial number to be assigned to a new change to the original data set.

22.

A computer-readable medium as in claim 1, wherein the state data is a collective value for the original data set.

Allowable Subject Matter

Claims 1-22 are allowed.

The following is an examiner's statement of reasons for allowance:

Claim 1 is allowable over the prior art in view of the applicant's arguments and the proposed amendments. The claims have been amended to more clearly clarify the use of the backup and the use of the three variables, most notably the state variable. The state variable is used to indicate whether it is an original or a backup, while also

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keeping track of whether a primary state node or a failover node is being used by checking the backup state indicator. The specific process of changing the original state variable to a backup and taking a snapshot of the dataset and then resetting the state variable to original again is novel in the opinion of the examiner. In view of the reasons listed above the claimed subject matter is allowable.

Claims 2-7, 22, and 23 are allowable through dependency on claim 1.

Claims 8-14 respectively are method claims corresponding to the computer readable medium claims 1-7. Therefore claims 8- 14 are allowable for the same rationale set forth in claims 1-7.

Claims 15- 21 respectively are computer system claims corresponding to the computer readable medium claims 1-7. Therefore claims 15-21 are allowable for the same rationale set forth in claims 1-7.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Assessor whose telephone number is (571) 272-0825. The examiner can normally be reached on M-F 9:30-6:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Scott Baderman can be reached on (571)272-3644. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BA


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